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[Title of the Invention] Postprocessing apparatus and postprocessing method

[Scope of Claim]

[Claim 1]

A postprocessing apparatus for performing a postprocessing with respect to an image forming member on which an image is to be formed, the postprocessing apparatus comprising:

attachment means for attaching a storage medium to the image forming member on which it has started to form the image.

[Claim 2]

The postprocessing apparatus according to claim 1, wherein:

the attachment means attaches the storage medium after a process of transferring the image onto the image forming medium.

[Claim 3]

The postprocessing apparatus according to claim 1 or 2, wherein:

the attachment means attaches the storage medium after a process of fixing the transferred image onto the image forming member.

[Claim 4]

The postprocessing apparatus according to any one of claims 1 to 3, further comprising:

data writing means for writing data into the storage medium.

[Claim 5]

The postprocessing apparatus according to claim 4, wherein:

an image forming apparatus for forming the image on the image forming member receives an operation of inputting data; and

the data writing means writes the input data into the storage medium.

[Claim 6]

The postprocessing apparatus according to claim 4 or 5, wherein:

the data writing means writes the data into the storage medium attached to the image forming member.

[Claim 7]

The postprocessing apparatus according to any one of claims 1 to 6, wherein:

an image forming apparatus for forming the image on the image forming member receives an operation of instructing attachment of the storage medium; and

the attachment means attaches the storage medium in response to the received operation.

[Claim 8]

The postprocessing apparatus according to any one of claims 1 to 6, wherein:

an external terminal connected through a

communication line to an image forming apparatus for forming the image on the image forming member or the postprocessing apparatus, receives an operation of instructing attachment of the storage medium; and

the attachment means attaches the storage medium in response to the received operation.

[Claim 9]

The postprocessing apparatus according to any one of claims 1 to 8, wherein:

the storage medium is held by a staple needle; and

the attachment means staples the staple needle holding the storage medium to the image forming member to attach the storage medium.

[Claim 10]

The postprocessing apparatus according to claim 9, wherein:

the attachment means staples the staple needle to the single image forming member.

[Claim 11]

The postprocessing apparatus according to any one of claims 1 to 8, wherein:

the storage medium is held by an adhesive member; and

the attachment means sticks the adhesive member holding the storage medium to the image forming member to attach the storage medium.

[Claim 12]

A staple needle to be attached to a sheet-shape member, the staple needle comprising:

storage-medium holding means for holding a storage medium storing data.

[Claim 13]

A staple needle to be attached to a sheet-shape member, the staple needle comprising:

data storage means for storing data.

[Claim 14]

The staple needle according to claim 12 or 13, wherein:

at least a part of a chassis of the staple needle serves as an antenna for transmitting/receiving or any of transmitting/receiving the stored data, and transmits/receives, transmits, or receives the stored data.

[Claim 15]

A method for performing a postprocessing with respect to an image forming member on which an image is to be formed, the method comprising:

attaching a storage medium to the image forming member on which it has started to form the image.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]

The present invention relates to a postprocessing apparatus and a postprocessing method, which mounts a non-contact memory on an image forming member on which an image is formed.

[0002]

[Conventional Art]

For example, "MYCOM PC WEB, NEWS HEADLINE" (dated July 5, 2002; http://pcweb.mycom.co.jp/news/2001/07/05/22.html) (document 1) discloses a compact semiconductor chip (for example, "μ-chip") from which stored data can be read externally in a non-contact manner.

Also, JP-A-2001-229199, JP-A-2000-285203, JP-A-2001-134672, JP-A-2001-283011, JP-A-2001-148000, and JP-A-2001-260580 (documents 2 to 8) disclose applications of the semiconductor chip.

[0003]

[Problem to be solved by the Invention]

The invention has been made based on the technical background. An object of the invention is to provide a postprocessing apparatus and a postprocessing method, which can mount a semiconductor chip on an image forming member on which an image is formed.

[0004]

[Means for Solving the Problem]

[Postprocessing Apparatus]

To achieve the above described object, a postprocessing apparatus according to the invention performs a postprocessing with respect to an image forming member on which an image is to be formed. The postprocessing apparatus includes attachment means for attaching a storage medium to the image forming member on which it has started to form the image.

[0005]

Preferably, the attachment means attaches the storage medium after a process of transferring the image onto the image forming medium.

[0006]

Preferably, the attachment means attaches the storage medium after a process of fixing the transferred image onto the image forming member.

[0007]

Preferably, the postprocessing apparatus further includes data writing means for writing data into the storage medium.

[0008]

Preferably, an image forming apparatus for forming the image on the image forming member receives an operation of inputting data, and the data writing means writes the input data into the storage medium.

[0009]

Preferably, the data writing means writes the data into the storage medium attached to the image forming member.

[0010]

Preferably, an image forming apparatus for forming the image on the image forming member receives an operation of instructing attachment of the storage medium, and the attachment means attaches the storage medium in response to the received operation.

[0011]

Preferably, an external terminal connected through a communication line to an image forming apparatus for forming the image on the image forming member or the postprocessing apparatus, receives an operation of instructing attachment of the storage medium, and the attachment means attaches the storage medium in response to the received operation.

[0012]

Preferably, the storage medium is held by a staple needle, and the attachment means staples the staple needle holding the storage medium to the image forming member to attach the storage medium.

[0013]

Preferably, the attachment means staples the staple needle to the single image forming member.

[0014]

Preferably, the storage medium is held by an adhesive member, and the attachment means sticks the adhesive member holding the storage medium to the image forming member to attach the storage medium.

[0015]

[Staple Needle]

Also, a staple needle according to the invention, to be attached to a sheet-shape member, includes storage-medium holding means for holding a storage medium storing data.

[0016]

Also, a staple needle according to the invention, to be attached to a sheet-shape member, includes data storage means for storing data.

[0017]

Preferably, at least a part of a chassis of the staple needle serves as an antenna for transmitting/receiving or any of transmitting/receiving the stored data, and transmits/receives, transmits, or receives the stored data.

[0018]

[Postprocessing Method]

Also, a method according to the invention, for performing a postprocessing with respect to an image forming member on which an image is to be formed, includes attaching a storage medium to the image forming member on which it has started to form the image.

[0019]

[Embodiment of the Invention]

[Background]

For the purpose of helping to understand the invention, the background under which the invention was made will be described.

A very small-sized semiconductor chip is attached to a paper medium, and information is stored in this semiconductor chip. Thereby, the information stored in this semiconductor chip can be supplied in addition to image information printed on the surface of the paper medium.

As a method of printing an image on a paper medium, when an electrophotographic system is employed, a transfer process for transferring a toner image onto the paper medium and a fixing process for fixing the transferred image on the paper medium are carried out. Under these transferring/fixing processes, the paper medium is exposed to either a high temperature environment or a high voltage environment.

Heat, or high voltages adversely influence the semiconductor chip attached to a paper medium. Therefore, there is feared that this semiconductor chip may be destroyed under either high temperature or high voltage environments in the image forming process.

[0020]

In view of those background, the postprocessing

method according to the invention mounts a semiconductor chip (storage medium) to a paper medium (image forming member) after an image is formed, to prevent the semiconductor chip from being destroyed by high temperature or high voltage generated by the image forming process.

[0021]

[Outline]

An outline of the invention will be explained with giving examples.

In a postprocessing method according to the invention, for example, a staple needle, which holds thereon a semiconductor chip, is stapled with respect to a paper medium on which an image has been formed to mount the semiconductor chip thereon.

Fig. 1(A) shows an example of a first staple needle 42, which is used in the postprocessing method of the invention. Fig. 1(B) shows an example of the staple needle 42, which has been stapled.

As shown in Fig. 1(A), the staple needle 42 is made of a "U-shaped" metal piece. This metal staple needle 42 includes a holding portion 422 (storage-medium holding means) for holding thereon an IC chip 3, projection portions 424 which are projected from the holding portion 422, and needle-shaped leg portions 426, which project from both edges of the holding portion 422 at a substantially right angle.

[0022]

When the holding portion 422 is stapled in a printing paper 40, a inner plane of the U shape is engaged with the printing paper 40. The IC chip 3 is held on a rear plane of a plane, which is engaged with the printing paper 40.

The projection portions 424 of this staple needle 42 are provided on the same plane where the IC chip 3 of the holding portion 422 is held.

The projection portions 424 are arranged in the vicinity of the both edges of the IC chip 3, and project from the IC chip 3 at a level higher than this IC chip 3.

Assuming that the holding portion 422 is set as a reference, the leg portions 426 project along a direction opposite to the IC chip 3 and the projection portions 424.

[0023]

As shown in Fig. 1(B), when the staple needle 42 is depressed by a stapler 54, after the leg portions 426 passes through the printing paper 40, these leg portions 426 abut against a needle receiving base 58 and then are bent.

Since the projection portion 424 project at the higher level from the IC chip 3, when the staple needle 42 is depressed, the projection portions 424 prevent the IC chip 3 from being depressed by the stapler 54.

A portion of the staple needle 42 may function as an antenna when the IC chip 3 transmits/receives data.

[0024]

Fig. 2 is a diagram showing an example of the printing paper 40 to which the staple needle 42 (Fig. 1) is attached.

As shown in Fig. 2, the staple needle 42 is attached to the printing paper 40 (image forming member) on which an original image is printed.

The IC chip 3 (Fig. 2) is held on the staple needle 42. This printing paper 40 can provide information stored in the IC chip 3 in addition to the original image printed thereon.

As described above, the postprocessing method according to the invention staples the staple needle 42 on the printing paper 40 after the image is printed thereon. Thereby, the IC chip 3 is added to the printing paper 40.

[0025]

[Embodiment]

An embodiment of a postprocessing method according to the present invention will now be described more in detail with reference to a specific example.

Fig. 3 is a diagram showing a hardware structure of a copying apparatus to which a postprocessing method according to the present invention is applied with mainly focusing on a control apparatus.

As shown in Fig. 3, the copying apparatus 1 includes

the control apparatus 2 for controlling an entirety of the copying apparatus 1, a printing unit 10 for forming an image, and a postprocessing unit 50 for performing a postprocessing such as a staple process.

The printing unit 10 prints an image on the printing paper 40 by using an electrophotographic system.

The postprocessing unit 50 staples the staple needle 42 on, for example, the printing paper 40.

The control apparatus 2 includes a control apparatus main body 20, a communication apparatus 22, a recording apparatus 24 such as an HDD/CD apparatus, a user interface apparatus (UI apparatus) 26, and an IC chip interface (IC chip IF) 28 (data writing means). The control apparatus main body 20 contains a CPU 202, a memory 204, and the like. The user interface apparatus 26 contains either an LCD display apparatus or a CRT display apparatus, and a keyboard/touch panel, and so on. The IC chip interface 28 contains an antenna 280.

[0026]

[Copying Apparatus 1]

Fig. 4 is a diagram for exemplifying a hardware structure of the copying apparatus shown in Fig. 3 with mainly focusing on both a printing unit thereof and the postprocessing unit.

As shown in Fig. 4, the printing unit 10 includes a paper tray part 12, a print engine 14, a fixing roller 15, a pressure roller 16, a scanner 17, an original feeding

apparatus 18, and so on. The print engine 14 forms a toner image on the printing paper 40. The fixing roller 15 heats the toner image formed on the printing paper 40 to fix the heated toner image. The pressure roller 16 depresses the printing paper 40 along a direction of the fixing roller 15. The scanner 17 reads an image of an original. The original feeding apparatus 18 feeds the original.

[0027]

The postprocessing unit 50 includes a compile tray 52, a stapler 54 (attachment means), a cam 56, a needle receiving base 58, and the like. The compile tray 52 stores thereinto the printing paper 40 transported from the printing unit 10. The stapler 54 staples the staple needle 42 (Fig. 1) to the printing paper 40 stored in the compile tray 52. The cam 56 rotates an eccentric shaft so as to depress the stapler 54. The needle receiving base 58 receives the staple needle 42 and bends this received staple needle 42.

Also, the IC chip IF 28 and the antenna 280 are arranged in the vicinity of a transport path through which the printing paper 40 is transported, which is postprocessed in the postprocessing unit 50. The UI apparatus 26 is arranged at an upper portion of the printing unit 10.

In other words, the copying apparatus 1 employs a hardware structure that the IC chip IF 28 and the antenna 280 are added to a general-purpose copying apparatus in

which an image of an original is read to be printed on the printing paper 40 and then, the image-printed printing paper 40 is postprocessed by way of a staple process.

As shown in Fig. 4, the control apparatus 2 (Fig. 3) is actually stored into the printing unit 10, and the IC chip IF 28 and the antenna 280 (Fig. 3) are stored into the postprocessing unit 50.

[0028]

[IC Chip 3/IC Chip IF 28]

Fig. 5 is a diagram schematically showing a structure of the IC chip 3 shown in Fig. 1(A).

Fig. 6 is a diagram schematically showing a structure of the IC chip IF 28 shown in Figs. 3 and 4.

As shown in Fig. 5, the IC chip 3 includes a clock reproducing circuit 320, a memory circuit 322, a data transmitting/receiving circuit 324, and a power supply circuit 326.

[0029]

Also, as shown in Fig. 6, the IC chip IF 28 includes a transmitting circuit 284, a receiving circuit 286, a transmission/reception control circuit 282, a demodulating circuit 288, and a modulating circuit 290.

In accordance with the below-mentioned operations of each constituent component of the IC chip 3 and the IC chip IF 28, information (data), which is stored in the IC chip 3, is read therefrom via the IC chip IF 28 in a non-contact manner.

[0030]

In the IC chip 3 (see Fig. 5), the power supply circuit 326 rectifies an electromagnetic wave signal supplied via the staple needle 42 (Fig. 1 and Fig. 5) to supply electric power to each constituent component of the IC chip 3, while this electric power is required for the constituent components.

[0031]

The clock reproducing circuit 320 reproduces a clock signal from the electromagnetic wave signal supplied from via the staple needle 42 (Fig. 1 and Fig. 5) from the IC chip IF 28 and then, outputs this reproduced clock signal to the memory circuit 322 and the data transmitting/receiving circuit 324.

[0032]

The memory circuit 324 is, for example, a nonvolatile RAM (random access memory). This memory circuit 324 stores thereinto data indicating information, which is input from the data transmitting/receiving circuit 324 in synchronization with the clock signal input from the clock reproducing circuit 320.

Also, the memory circuit 322 outputs data indicating information stored therein to the data transmitting/receiving circuit 324 in synchronization with the clock signal.

[0033]

The data transmitting/receiving circuit 324

demodulates the electromagnetic wave signal input via the staple needle 42 (Figs. 1 and 5) into data and then, outputs this demodulated data to the memory circuit 322 in synchronization with the clock signal input from the clock reproducing circuit 320.

Also, the data transmitting/receiving circuit 324 changes a reflection intensity of an electromagnetic wave signal supplied from the IC chip IF 28 in accordance with a value of data input from the memory circuit 322 in synchronization with the clock signal.

As described above, the data indicating the information, which is stored in the memory circuit 322, is transmitted from the IC chip 3 to the IC chip IF 28 by changing the intentisy of the reflection signal of the electromagnetic wave signal transmitted from the IC chip IF 28 to the IC chip 3.

[0034]

In the IC chip IF 28 (Fig. 6), the transmission/reception control circuit 282 controls an operation of each constituent component of the IC chip IF 28.

Also, this transmission/reception control circuit 282 outputs data input from the control apparatus main body 20 (printing program 7, which will be discussed later with reference to Fig. 7) to the modulating circuit 290.

Further, this transmission/reception control circuit 282 outputs data, which has been received by the

reception circuit 286 and then has been demodulated by the demodulating circuit 288, to the control apparatus main body 20.

[0035]

The modulating circuit 290 modulates a high frequency signal (radio frequency signal) based on data input from the transmission/reception control circuit 282 to produce an electromagnetic wave signal and then, outputs this produced electromagnetic wave signal to the transmitting circuit 284.

[0036]

The transmitting circuit 284 transmits the electromagnetic wave signal via the antenna 280 to the IC chip 3. This electromagnetic wave signal contains data to be stored in the IC chip 3, and the clock signal.

[0037]

The receiving circuit 296 receives a reflection signal, which is reflected from the IC chip 3, and then outputs this received reflection signal to the demodulating circuit 288.

[0038]

The modulating circuit 288 demodulates the data transmitted from the IC chip 3 based on a change of the reflection signal input from the receiving circuit 286, and then outputs the demodulated data to the transmission/reception control circuit 282.

[0039]

[Printing Program 7]

Fig. 7 is a block diagram for schematically showing a structure of a printing program 7, which is executed by the control apparatus 2 (see Figs. 3 and 4) to realize the postprocessing method according to the invention.

As shown in Fig. 7, the printing program 7 includes an image reading section 700, an UI section 710, a printing section 720, an IC chip attaching section 730, and a data writing section 740.

The printing program 7 is supplied via, for instance, the recording medium 240 (Fig. 3) to the control apparatus 2, and then is loaded to the memory 204 so as to be executed.

[0040]

In the print program 7, the image reading section 700 controls the constituent components of the printing unit 10 such as the scanner 17 (Fig. 4) to read an original image displayed on an original.

[0041]

The UI section 710 receives an operation of a user with respect to the UI apparatus 26 (Figs. 3 and 4), and outputs data for instructing mounting of the IC chip 3 to the IC chip attaching section 730.

Also, the UI section 710 receives an operation of the user with respect to the UI apparatus 26, and outputs data, which is to be written into the IC chip 3, to the data writing section 740.

[0042]

When data of an original image is input from the image reading section 700, the printing section 720 controls each constituent component of the printing unit 10 such as the print engine 14 (Fig. 4) to print the original image on the printing paper 40.

[0043]

When the IC chip attaching section 730 is instructed to mount the IC chip 3 from the UI section 710, this IC chip attaching section 730 controls the stapler 54 (Fig. 4) so that this stapler 54 staples the staple needle 42 (Fig. 1) on the printing paper 40 on which the original image is printed.

[0044]

When data is input from the UI section 710 to the data writing section 740, this data writing section 740 controls the IC chip IF 28 (Figs. 3 and 4) to write this input data into the IC chip 3 attached to the printing paper 40.

[0045]

[Overall Operation]

Next, overall operation of the copying apparatus 1 will be described.

Fig. 8 is a flow chart for describing an operation (S10) of the copying apparatus 1 (printing program 7).

As shown in Fig. 8, in a step 100 (S100), a user performs an operation for instructing a commencement of a printing operation with respect to the UI apparatus

26 (Figs. 3 and 4).

Upon receipt of this operation, the UI section 710 (Fig. 7) outputs data for instructing the commencement of the printing operation to the image reading section 700 and the like.

[0046]

In a step 102, when the operation of the commencement of the printing operation is carried out with respect to the UI apparatus 26 (Figs. 3 and 4), the image reading section 700 controls the scanner 17 (Fig. 4) and the like to read an original image displayed on an original.

[0047]

In a step 104 (S104), the printing section 720 (Fig. 7) controls the print engine 14 (Fig. 4) so that a toner image of the read original image is formed on a drum (not shown), and then, the formed toner image is transferred onto the printing paper 40.

[0048]

In a step 106 (S106), the printing section 720 (Fig. 7) controls the fixing roller 15 (Fig. 4) and the pressure roller 16 (Fig. 4) to heat the toner image on the printing paper 40 and to fix the transferred toner image onto the printing paper 40.

The printing paper 40 on which the toner image is fixed is transported to the postprocessing unit 50 (Fig. 4) to be stored in the compile tray 52 (Fig. 4).

[0049]

In a step 108 (S108), the printing program 7 (Fig. 7) judges as to whether or not a designated sheet of printing operation has been completed.

When the printing program 7 judges that the designated sheet of printing operation has been completed, the process is advanced to another process of a step S110, whereas in other cases than the above-explained case, the processes from the step S102 to the step S106 are repeatedly carried out.

[0050]

For example, when the user merely performs to commence a printing operation with respect to the UI apparatus 26 (Figs. 3 and 4), the copying apparatus 1 executes a simple copying process operation.

In contrast to this operation, when the user performs to commence the printing operation after the user has instructed the UI apparatus 26 to attach the IC chip 3, the copying apparatus 1 executes the postprocessing operation according to the present invention.

In the step 110 (S110), the UI section 710 (Fig. 7) judges whether the user simply performs the operation for the copying operation, or instructs to attach the IC chip 3.

When the user executes the former operation (copying operation), the printing program 7 is advanced to a process of a step S116, whereas in other cases than the above-described case, the printing program 7 is advanced

to another process operation of a step S112.

[0051]

In the step 112 (S112), the IC chip attaching section 730 (Fig. 7) controls the stapler 54 (Fig. 4) and the like to staple the staple needle 42 on which the IC chip 3 is held to the printing paper 40 stored in the compile tray 54.

Even when total sheet of printing paper 40 stored in the compile tray 54 is one sheet, the IC chip attaching section 730 staples the staple needle 42 on one sheet of this printing paper 40.

[0052]

In a step 114 (S114), the data writing section 740 (Fig. 7) controls the IC chip IF 28 (Fig. 4) to write data into the IC chip 3 attached to the printing paper 40.

When the data writing operation is completed, the postprocessing unit 50 (Fig. 4) transports and discharges the printing paper 40, and the process operation is ended.

[0053]

In a step 116 (S116), the postprocessing unit 50 executes the normal postprocessing operation, for example, punching or stapling operation with respect to the printing paper 40, and then, the process operation is terminated.

When attaching of the IC chip 3 is not instructed, the postprocessing unit 50 prohibits the stapling process

operation when one sheet of printing paper 40 is stored in the compile tray 54.

[0054]

As described above, after the process operations executed under high temperature/high voltage environments in the printing operation have been completed, the copying apparatus 1 staples the staple needle 42 on which the IC chip 3 is held on the printing paper 40.

[0055]

[Modifications of Staple Needle]

It should also be noted that if a staple needle holds the IC chip 3 and can be protected in such a manner that this staple needle is not depressed by a stapler 54 (Fig. 1(B)), this staple may be made of other shapes than the above-described shape of the staple needle 42.

Modifications of the staple needle 42 will now be explained below.

[0056]

First, a second staple needle 44 will now be explained.

Fig. 9(A) shows an outer appearance when a second staple needle 44 is viewed from an oblique direction, and Fig. 9(B) is a diagram for explaining a sectional view of the second staple needle 44 indicated in (A) taken along a two-dot/dash line thereof.

As shown in Fig. 9A, the second staple needle 44 includes a plate-shaped holding portion 422 and

needle-shaped leg portions 426.

The holding portion 422 has a plate shape in which a plane depressed by the stapler 54 is larger than an adjacent plane thereto. The holding portion 422 defines an opening portion, which open toward a direction depressed by the stapler 54.

As described above, since the IC chip 3 is stored in the opening portion of the second staple needle 44, when the stapler 54 (Fig. 1(B)) staples this second staple needle 44, the IC chip 3 is protected in the housing of the second staple needle 44, and thus, is not depressed.

The leg portions 426 of the second staple needle 44 are essentially same as those of the first staple needle 42.

[0057]

As shown in Fig. 9B, the holding portion 422 has a thickness thicker than that of the IC chip 3 to prevent the IC chip 3 from being depressed by the stapler 54.

Also, the opening portion formed in the holding portion 422 is opened more largely as approaching to a plane, which is engaged with the printing paper 40. The IC chip 3 has the substantially same shape as the shape of the opening portion of the holding portion 422.

As a result, the IC chip 3 held in the opening portion does not pass through the opening portion in a rear direction of the plane engaging with the printing paper 40. When the staple needle 44 is stapled to the printing

paper 40, the IC chip 3 is held by the printing paper 40 and the holding portion 422 and thus is undisconnectable.

[0058]

As described above, the construction in which the opening portion is formed in the second staple needle 44 and the IC chip 3 is stored in this opening portion is suitable for a case that the IC chip 3 is weak against pressure.

[0059]

Next, a third staple needle 46 will now be explained.

Fig. 10(A) illustratively shows an outer appearance of this third staple needle 46 viewed from an oblique direction. Fig. 10(B) is an explanatory diagram showing a sectional view of the third staple needle 46 shown in Fig. 10(A) taken along a two-dot/dash line.

As shown in Fig. 10(A), the third staple needle 46 includes a plate-shaped holding portion 422 and plate-shaped leg portions 427.

The leg portions 427 are provided in such a manner that these leg portions 427 are located on both ends of the holding portion 422 at a substantially right angle with respect to this holding portion 422.

The plate-shaped holding portion 422 of this third staple needle 46 is essentially same as that of the second staple needle 44 except for a shape of an opening thereof.

[0060]

As shown in Fig. 10(B), the opening portion of this third staple needle 46 is an opening having the substantially same sizes from a plane of this opening portion engaging with the printing paper 40 to a rear plane thereof.

The leg portions 427 are made in a thin-plate shape in such a manner that these leg portions 427 can pass through the printing paper 40.

Also, the leg portions 427 are made thin in such a degree that when the leg portions 427 abut against the needle receiving base 58, it is bent.

Since this third staple needle 46 may be constituted in such a manner that even after this third staple needle 46 has been stapled on the printing paper 40, the IC chip 3 can be detachably mounted on this third staple needle 46. This third staple 42c is suitable for such a case that this IC chip 3 is desired to be replaced with other IC chips several times.

[0061]

Next, a fourth staple needle 48 will now be explained.

Fig. 11(A) illustratively shows an outer appearance of the fourth staple needle 48 viewed from an oblique direction.

Fig. 11(B) is an explanatory diagram showing a sectional view of the fourth staple needle 48 shown in Fig. 11(A) taken along a two-dot/dash line.

As shown in Fig. 11(A), the fourth staple needle

48 includes a plate-shaped holding portion 422 and folded needle-shaped leg portions 428.

The holding portion 422 has a thinner hexagonal-cylinder shape. The leg portions 428 are connected to side surfaces of this hexagonal cylinder.

The leg portions 428 each has a needle shape, which is bent at a substantially right angle. The respective two leg portions 428 are elongated in opposite directions to each other from the side surface of the holding portion 422, and also are folded in the same direction.

[0062]

As shown in Fig. 11(B), the fourth staple needle 48 has an opening portion a dimension of which is gradually increased as approaching from a plane thereof engaging with the printing paper 40 to a rear plane thereof.

Since this fourth staple needle 48 holds the IC chip 3 in the opening portion, even after this fourth staple needle 48 has been stapled on the printing paper 40, the IC chip 3 may be more easily and detachably mounted in this opening portion.

Also, since the holding portion 422 of this fourth staple needle 48 is made smaller, when this fourth staple needle 48 is stapled in the printing paper 40, the fourth staple needle 48 can be hardly and visibly recognized.

[0063]

[Adhesive Tape]

The embodiments in which the IC chips 3 are held

in the staple needles have been described. The IC chip 3 may be held on an adhesive tape and this adhesive tape may be stuck to the printing paper 40.

[0064]

Fig. 12 is a diagram showing an example of an adhesive tape 53, which holds thereon an IC chip 3.

As shown in Fig. 12, the adhesive tape 53 (adhesive member) includes an adhesive plane having an adhesive characteristic, and a non-adhesive plane having no adhesive characteristic. The IC chip 3 is held on this adhesive plane of the adhesive tape 53.

The adhesive tape 53 is cut out at positions indicated by broken lines, and then, the cut adhesive tapes 53 are stuck to the printing paper 40.

[0065]

Fig. 13 is a diagram showing a second copying apparatus 102, which mounts the IC chip 3 by utilizing the adhesive tape 53 (Fig. 12).

As shown in Fig. 13, this second copying apparatus 102 includes a second postprocessing unit 502.

Constituent components of the second copying apparatus 102, which are substantially same as those of the first copying apparatus 1, are allotted the same reference numerals.

[0066]

The postprocessing unit 502 includes the adhesive tape 53 on which the IC chip 3 is held, a punch 55, and

a cam 56, and the like. The punch 55 sticks the adhesive tape 53 to the printing paper 40. The cam 56 rotates an eccentric shaft to move the punch 55 in upper/lower directions.

The punch 55 is always urged in the lower direction by force exerted from a spring.

When the cam 56 is rotated to push up the punch 55, the punch 55 may push up the adhesive tape 53, which is bridged in an upper direction, and then punches a portion of the adhesive tape 53 where the IC chip 3 is held, and thereafter sticks the punched adhesive tape to a rear surface of a plane of the printing paper 40 on which an image is formed.

[0067]

Fig. 14 is a flow chart for describing an operation (step S12) of the second copying apparatus 102 (printing program 7) with employment of the adhesive tape 53.

Steps of Fig. 14, which are substantially same as those of Fig. 8, are allotted the same reference numerals.

In the processing of this second copying apparatus 102, when it is so judged that an instruction of attaching the IC chip 3 is issued in a process of a step S110, the IC chip attaching section 730 (Fig. 7) controls the punch 55 (Fig. 13) and the like to adhere the adhesive tape 53 on which the IC chip 3 is held to the printing paper 40 in a process of a step 116 (S116).

[0068]

As described above, the second copying apparatus 102 can attach the IC chip 3 to the printing paper 40 by employing the adhesive tape 53.

[0069]

[Network Printer]

The copying apparatus 1 receives the operation of the user via the UI apparatus 26 (Figs. 3 and 4) of this copying apparatus 1, so that this copying apparatus 1 attaches the IC chip 3 and also writes the data into this IC chip 3. Alternatively, the copying apparatus 1 may receive an instruction via a network from a computer terminal connected to this copying apparatus 1, so that this copying apparatus 1 may attach the IC chip 3 and write data into this IC chip 3.

[0070]

Fig. 15 is a diagram showing a network structure of the copying apparatus 1, which shared by a plurality of computer terminals.

The copying apparatus 1 is connected via a network 220 such as a LAN (Local Area Network) to a computer terminal 82, another computer terminal 84, still another computer terminal 86, and a computer 88.

The copying apparatus 1 is a composite machine equipped with a copy function and a printer function. The copy apparatus 1 prints image data received from the computer terminal 82.

Also, in response to an input operation for the

computer terminals 82, the copying apparatus 1 controls the postprocessing unit 50 (Fig. 4) to attach the IC chip 3.

Furthermore, the copying apparatus 1 receives data, which is input from the computer terminal 82 and the like, via the network 220 and then, writes the received data into the IC chip 3.

[0071]

As described above, since this copying apparatus 1 attaches the IC chip 3 and writes data into this attached IC chip 3 in response to the instruction issued from the computer terminal 82 and the like, the user can perform various operations by instructing with respect to the computer terminals only one time. These various operations may include a transmission of print data, a printing instruction, attaching of the IC chip 3, a transmission of data to be written into the IC chip 3, and a data writing instruction to the IC chip 3.

[0072]

[Advantage of the Invention]

As described above in detail, in accordance with the postprocessing apparatus and the postprocessing method of the present invention, the semiconductor chip can be mounted on the image forming member where the image is to be formed.

[Brief Description of the Drawings]

[Fig. 1]

(A) is a diagram for exemplifying a first staple needle employed in a postprocessing method of the present invention, and (B) is a diagram for exemplifying the staple needle which has been stapled.

[Fig. 2]

Fig. 2 is a diagram for exemplifying a printing paper to which the staple needle (Fig. 1) has been attached.

[Fig. 3]

Fig. 3 is a diagram showing a hardware structure of a copying apparatus to which a postprocessing method according to the present invention is applied with mainly focusing on a control apparatus.

[Fig. 4]

Fig. 4 is a diagram for exemplifying a hardware structure of the copying apparatus shown in Fig. 3 with mainly focusing on both a printing unit thereof and the postprocessing unit.

[Fig. 5]

Fig. 5 is a diagram showing a structure of an IC chip shown in Fig. 1(A).

[Fig. 6]

Fig. 6 is a diagram showing a structure of an IC chip IF shown in Fig. 3 and Fig. 4.

[Fig. 7]

Fig. 7 is a diagram showing a configuration of a printing program, which is executed by the control apparatus (Fig. 3 and Fig. 4) so as to realize the

postprocessing method according to the present invention.

[Fig. 8]

Fig. 8 is a flow chart for describing operations (S10) of the copying apparatus (printing program).

[Fig. 9]

(A) shows an outer appearance when a second staple needle 44 is viewed from an oblique direction, and (B) is a diagram for explaining a sectional view of the second staple needle 44 indicated in (A) taken along a two-dot/dash line thereof.

[Fig. 10]

(A) shows an outer appearance when a third staple needle 46 is viewed from an oblique direction, and (B) is a diagram for explaining a sectional view of the third staple needle 46 indicated in Fig. 10(A) taken along a two-dot/dash line thereof.

[Fig. 11]

(A) shows an outer appearance when a fourth staple needle 48 is viewed from an oblique direction, and (B) is a diagram for explaining a sectional view of the fourth staple needle 48 indicated in Fig. 11(A) taken along a two-dot/dash line thereof.

[Fig. 12]

Fig. 12 is a diagram showing an adhesive tape holding an IC chip.

[Fig. 13]

Fig. 13 is a diagram showing a second copying

apparatus for attaching an IC chip 3 with using an adhesive tape (Fig. 12).

[Fig. 14]

Fig. 14 is a flow chart showing an operation (S12) of a copying apparatus (printing program), which uses an adhesive tape.

[Fig. 15]

Fig. 15 is a diagram showing a network structure of the copying apparatus, which is shared by a plurality of computer terminals.

[Description of Reference Numerals]

1, 102 copying apparatus
10 print unit
12 paper tray part
14 print engine
15 fixing roller
16 pressure roller
17 scanner
18 original feeding apparatus
2 control apparatus
20 control apparatus main body
202 CPU
204 memory
22 communication apparatus
220 network
24 recording apparatus
240 recording medium

26 UI apparatus

28 IC chip IF

280 antenna

7 printing program

700 image reading section

710 UI section

720 printing section

730 IC chip attaching section

740 data writing section

50, 502 postprocessing section

52 compile tray

53 adhesive tape

54 stapler

55 punch

56 cam

58 needle receiving base

40 printing paper

3 IC chip

320 clock reproducing circuit

322 memory circuit

324 data transmitting/receiving circuit

326 power supply circuit

42 staple needle

422 holding portion

424 protrusion portion

426, 427, 428 leg portions

[Name of Document] Abstract

[Abstract]

[Object] Mount a semiconductor chip on an image forming member on which an image is to be formed.

[Solving Means]

A printing unit 10 of a copying apparatus 1 forms an image on a printing paper 40 by way of an electrophotographing system in response to an operation executed with respect to a UI apparatus 26. A postprocessing unit 50 of the copying apparatus 1 staples a staple needle 42 holding an IC chip 3 to the printing paper 40 on which the image has been formed, and writes data input from the UI apparatus 26 into the IC chip 3 held by the staple needle 42.

[Selected Drawing] Fig. 1

Name of Document

【書類名】 ~~図面~~ Drawing

【図1】

FIG. 1

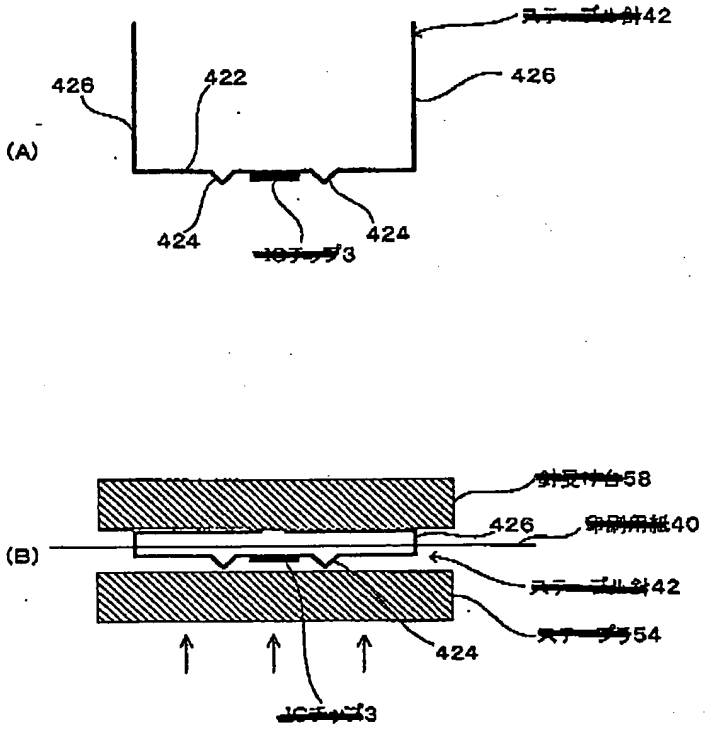


FIG. 1

(A)

3 IC chip

42 staple needle

(B)

3 IC chip

40 printing paper

42 staple needle

54 stapler

58 needle receiving base

~~【図2】~~

FIG. 2

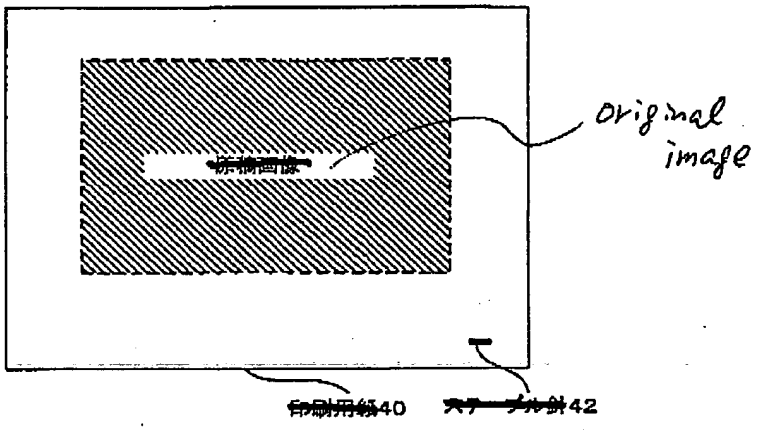


FIG. 2

40 printing paper

42 staple needle

~~【図3】~~

FIG.3

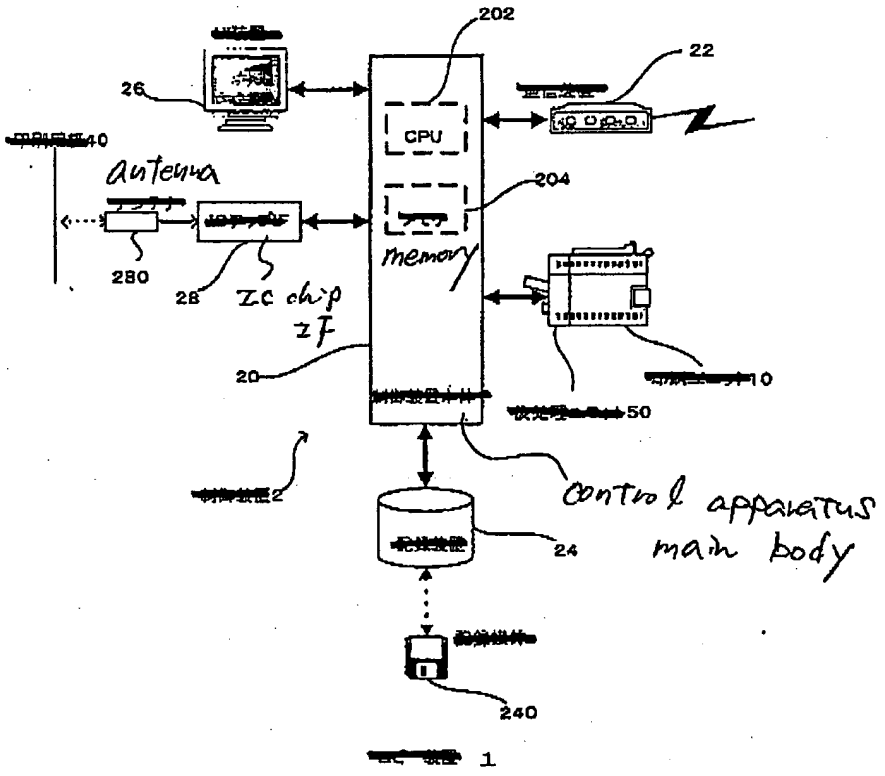

202
22
26
CPU
antenna
204
memory
280
28
ZC chip
IF
20
10
50
2
control apparatus
main body
24
240
1

FIG. 3

1	copying apparatus
2	control apparatus
10	print unit
22	communication apparatus
24	recording apparatus
26	UI apparatus
40	printing paper
50	postprocessing unit
240	recording medium

【図4】

FIG. 4

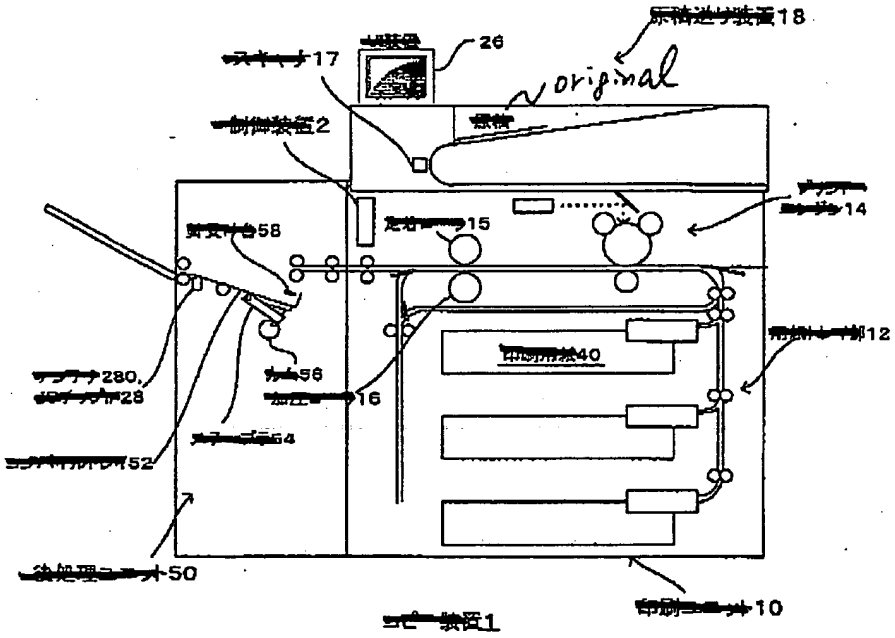


FIG. 4

1	copying apparatus
2	control apparatus
10	print unit
12	paper tray part
14	print engine
15	fixing roller
16	pressure roller
17	scanner
18	original feeding apparatus
26	UI apparatus
28	IC chip IF
40	printing paper
50	postprocessing unit
52	compile tray
54	stapler
56	cam
58	needle receiving base
280	antenna

~~[図5]~~

FIG. 5

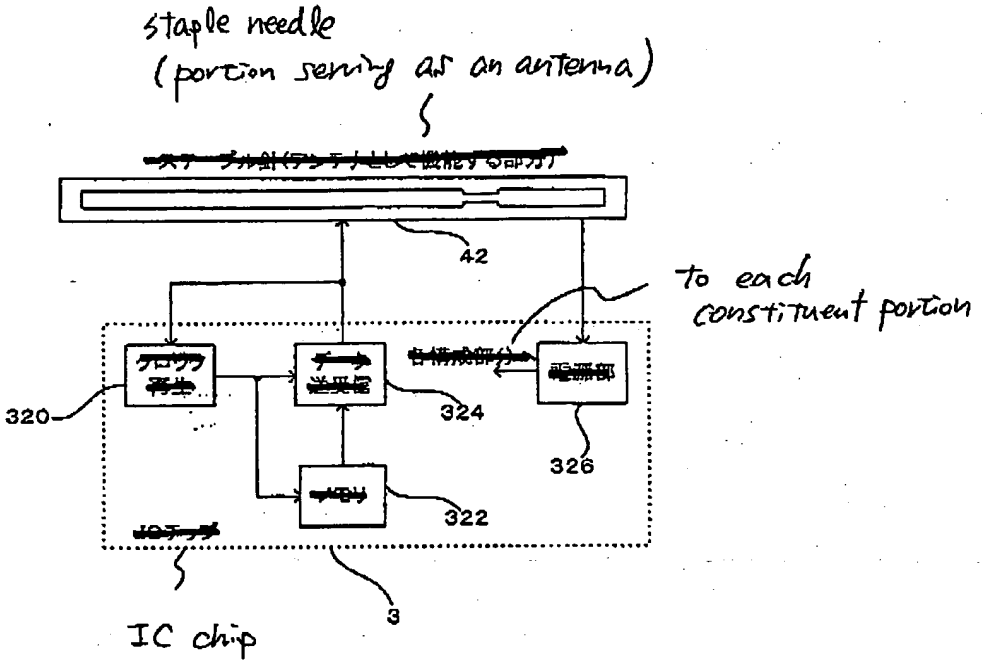

staple needle
(portion serving as an antenna)
42
to each
constituent portion
320
324
326
322
3
IC chip

FIG. 5

320 clock reproduction

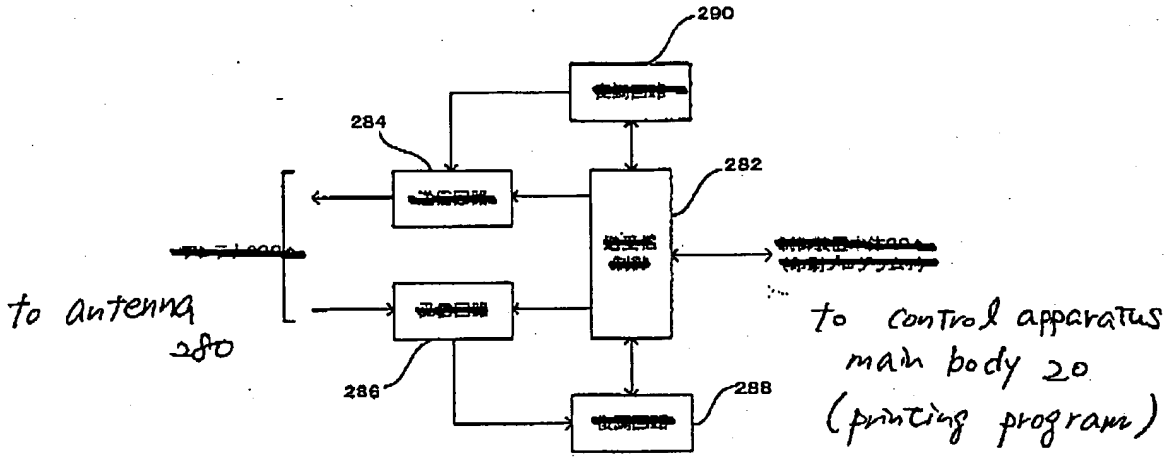
322 memory

324 data transmission/reception

326 power supply portion

~~図6~~

FIG.6



~~図7 別ページ~~ 28

FIG. 6

28 IC chip IF

282 transmission/reception control

284 transmitting circuit

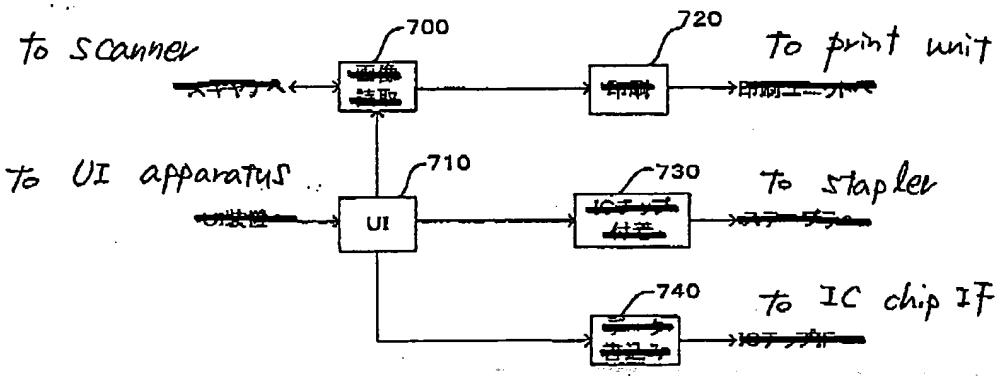
286 receiving circuit

288 demodulating circuit

290 modulating circuit

~~【図７】~~

FIG. 7



~~印刷プログラム７~~

FIG. 7

700 image reading

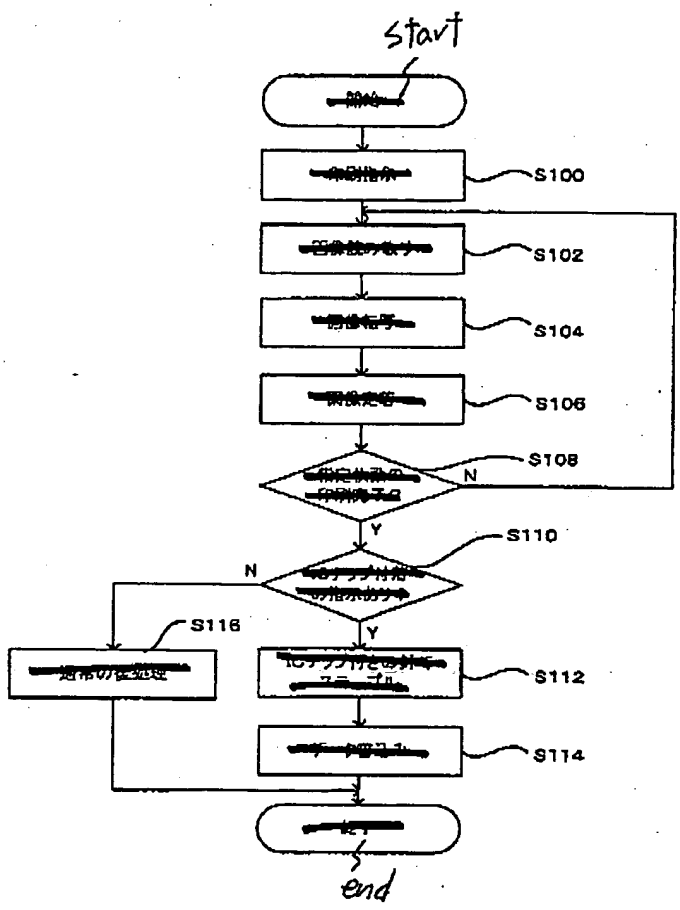
720 printing

730 IC chip attaching

740 data writing

~~【図８】~~

FIG. 8



S10

FIG. 8

S100 print instruction

S102 read image

S104 transfer image

S106 fix image

S108 Has a designated sheet of printing operation been completed?

S110 Are there instruction for attaching IC chip?

S112 staple needle with IC chip

S114 write data

S116 normal postprocessing

~~【図9】~~

FIG. 9

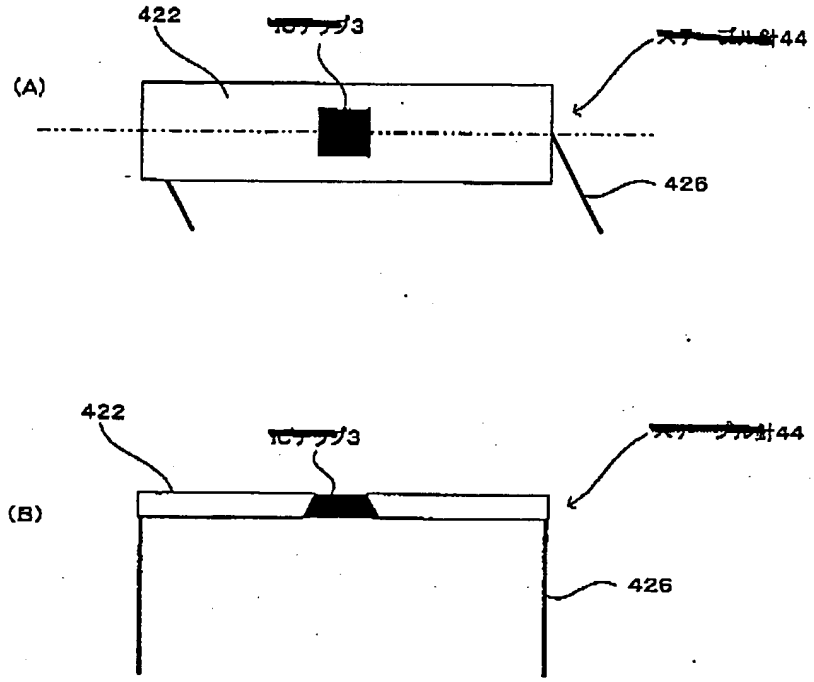


FIG. 9

(A)

3 IC chip

44 staple needle

(B)

3 IC chip

44 staple needle

~~【図１０】~~

FIG. 10

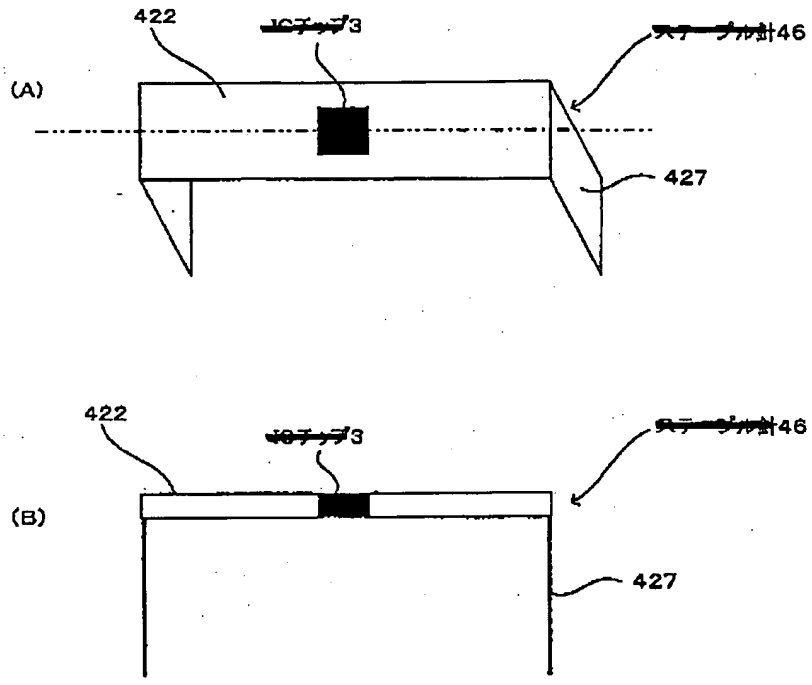


FIG. 10

(A)

3 IC chip

46 staple needle

(B)

3 IC chip

46 staple needle

【図１１】

FIG. 11

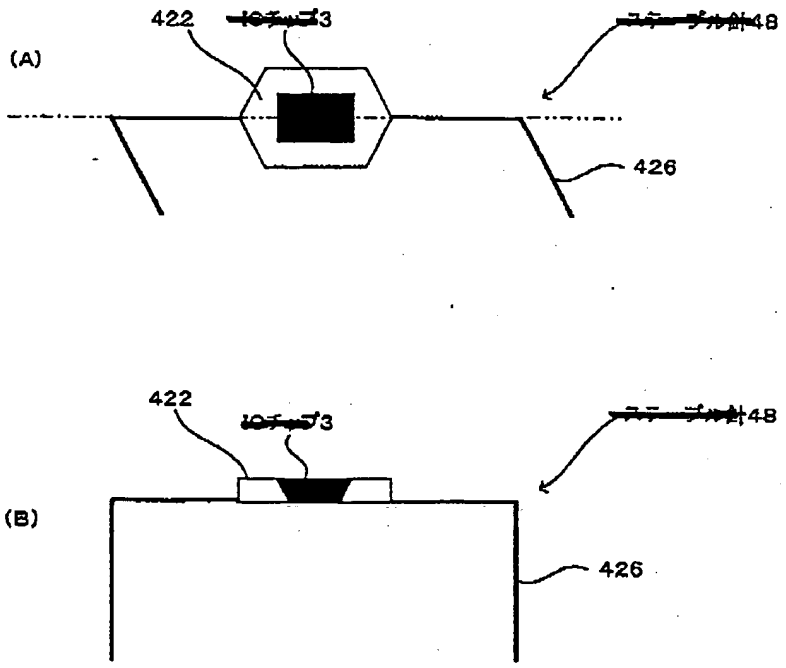


FIG. 11

(A)

3 IC chip

48 staple needle

(B)

3 IC chip

48 staple needle

~~【図12】~~

FIG. 12

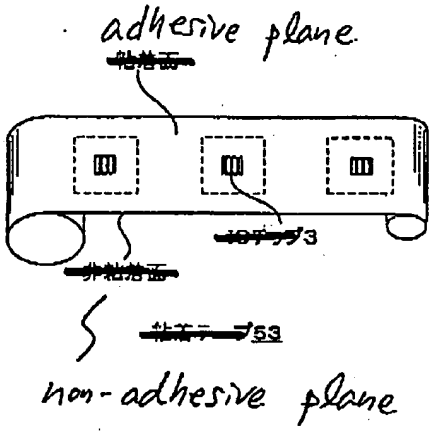


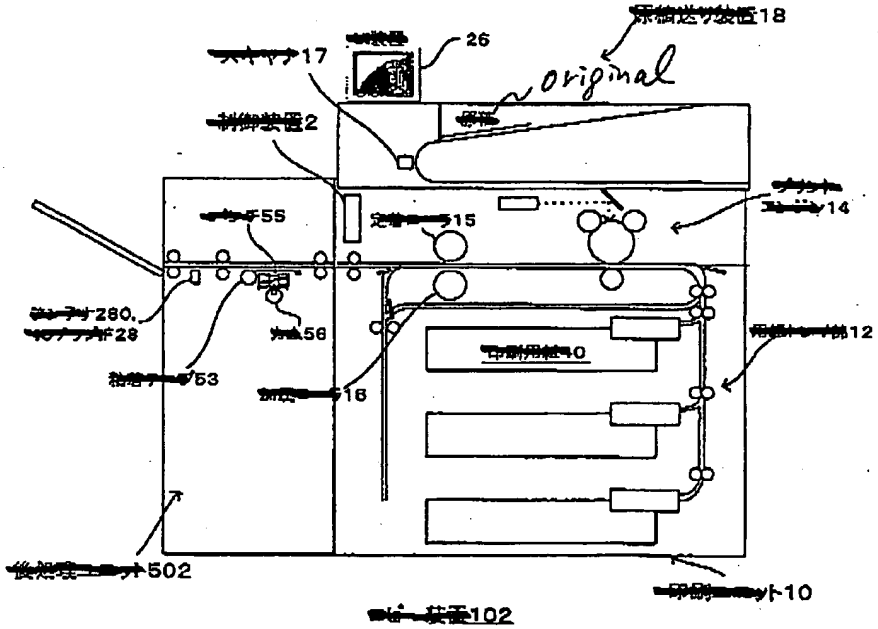
FIG. 12

3 IC chip

53 adhesive tape

[図1-3]

FIG. 13



102

FIG. 13

2	control apparatus
10	print unit
12	paper tray part
14	print engine
15	fixing roller
16	pressure roller
17	scanner
18	original feeding apparatus
26	UI apparatus
28	IC chip IF
40	printing paper
53	adhesive tape
55	punch
56	cam
102	copying apparatus
280	antenna
502	postprocessing unit

【図１４】

FIG. 14

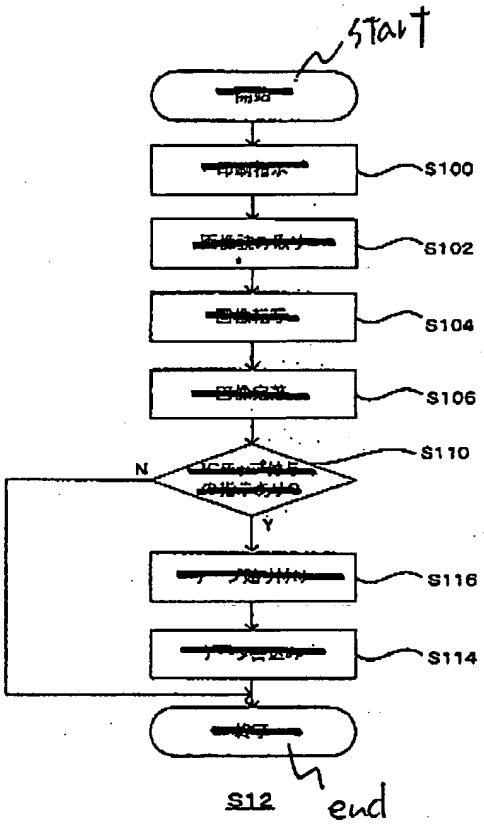


FIG. 14

S100 print instruction

S102 read image

S104 transfer image

S106 fix image

S110 Are there instruction for attaching IC chip?

S114 write data

S116 stick tape

[図15]

FIG. 15

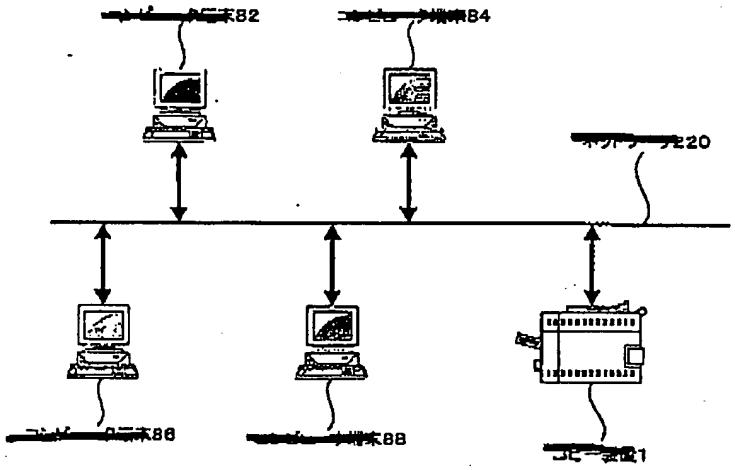


FIG. 15

1 copying apparatus

82, 84, 86, 88 computer terminal

220 network